DOCUMENT RESUME

ED 403 292 TM 026 012

TITLE	Planetary Patterns. Grade 8 Science, Language Usage. Maryland School Performance Assessment Program (MSPAP): Resource Library. Public Release Task.
INSTITUTION	Maryland State Dept. of Education. Baltimore. Div. of Planning, Results and Information Management.
PUB DATE	Jul 94
NOTE	20p.; A highly selective public release of certain pages.
PUB TYPE	Reports - Descriptive (141) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Criterion Referenced Tests; *Critical Thinking; Grade 8; Grouping (Instructional Purposes); Junior High Schools; *Language Usage; Networks; *Performance Based Assessment; Problem Solving; *Science Tests; Space Exploration; State Programs; Testing Programs; *Thinking Skills
IDENTIFIERS	*Maryland School Performance Assessment Program; *Planets

ABSTRACT

One component of the Maryland School Performance Assessment Program (MSPAP) is the state's performance-based assessments, criterion-referenced tests that require students to apply what they know and can do to solve problems and display other higher-order thinking skills. This document helps parents, teachers, students, and other citizens understand the tasks of the MSPAP. "Planetary Patterns," the eighth-grade science language usage task is presented. The "Student Response Book" is an actual operational test material that contains questions and other directions and gives space for students to enter their responses. In this task, students respond to hypothetical data sent back by a space probe about a new solar system and apply this information to written descriptions of the new system and planetary motion. The task manipulative, a set of orbit data logs, is attached, and the "Examiner's Manual" presents the directions teachers give students as they prepare for the task. Because of the complexity of the tasks, the State Department of Education distributes these selected task materials only in conjunction with a brief presentation by an educator. (SLD)

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ED 403 292

MSPAP
Public Release Task

Planetary Patterns

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Grade 8

Science
Language Usage

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Maryland State Department of Education
July 1994

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ACKNOWLEDGMENTS

The Maryland State Department of Education would like to thank:

- The hundreds of local school system staff who are members of the Content Coordinating Teams, the Test Administration Team, the Scoring Advisory Team, and the Task Development Teams that developed these and all MSPAP tasks.
- Its specialists from the Division of Instruction, the Division of Planning, Results, and Information Management, and other divisions for their assistance in the creation of MSPAP.

INTRODUCTION

Background and Purpose of This Document

Maryland public schools have embarked on an important mission: to "re-form" and improve Maryland public schools so that all children can learn, attend schools in which they can progress and learn, and have a real opportunity to learn equally rigorous content. The Maryland State Department of Education launched the Maryland School Performance Program, its strategy for improving public education, in 1989. One component of the Maryland School Performance Program is the state's performance-based assessments, often referred to as the "CRTs" (for criterion-referenced tests). These assessments require students to apply what they know and can do to solve problems, reason, explain, recommend, and display other "higher order" thinking skills. These assessments are officially called the Maryland School Performance Assessment Program (MSPAP).

The primary focus of MSPAP is *school performance*. However, individual student scores from MSPAP are also available. MSPAP assessment tasks assess student performance in grades 3, 5, and 8 in relation to the Maryland Learning Outcomes. These outcomes focus on what students should know and be able to do in reading, writing, language usage, mathematics, science, and social studies. MSPAP tasks and the learning outcomes they assess are sometimes confused with "outcome based education," an approach to teaching, learning, and managing schools which has its share of supporters and detractors. The purpose of this document is to help parents, teachers, students, and other Maryland citizens understand what MSPAP tasks are like.

This Document

This document contains information and materials related to one of nine operational MSPAP tasks that have been selected for public release. These nine tasks were selected to illustrate the types of activities, questions, and responses that MSPAP requires of students.

Contained in this document are actual operational test materials, including:

- *Student Response Book/Answer Book:* Contains questions and other directions to students and space for students to enter their responses.
- *Student Resource Materials Book/Resource Book:* Contains background reading and other information. Only some tasks require such background material.
- *Manipulatives:* Additional materials necessary for tasks (e.g., spinners for the mathematics task "School Fair").
- *Examiner's Manual:* Contains directions to teachers who administer MSPAP, including the directions they read to students verbatim.

Information on scoring these tasks is available in the *Scoring Guide — Introduction, Scoring Tools, and Sample Responses*. This document explains how student responses to the MSPAP are scored. It also contains criteria used to score student responses and sample student responses to all assessment activities in the task.

As you examine this document you will quickly see the complexity of the materials related to each MSPAP assessment task. Because of this complexity, MSDE distributes these tasks at the request of citizens only in conjunction with a brief guided presentation of the materials by an MSDE or local school system educator.

We hope you find the materials interesting and informative. We also expect that you will recognize the power that assessments like MSPAP have for guiding and goading improvements in school performance and student learning and for raising standards for performance for all Maryland public schools.

STUDENT RESPONSE BOOK

Wednesday, Task 2
Title: Planetary Patterns

During this task, you will be required to respond to activities by writing. Whenever you see this picture, it is important to check to make sure that what you have written is clear and complete and that you have used correct spelling, grammar, punctuation, and capitalization.

Read the introduction to the task and then complete Activity 1 by yourself. When you finish Activity 1, STOP and wait for more directions.

INTRODUCTION

You belong to a team of scientists working at the Goddard Space Flight Center in Greenbelt, Maryland. For years, you have been collecting information about our solar system sent to you by a *Voyager* space probe. Recently, the probe has traveled out of our solar system.

Imagine that *Voyager* is sending back data about an entirely new solar system. Here are some basic facts about this new solar system:

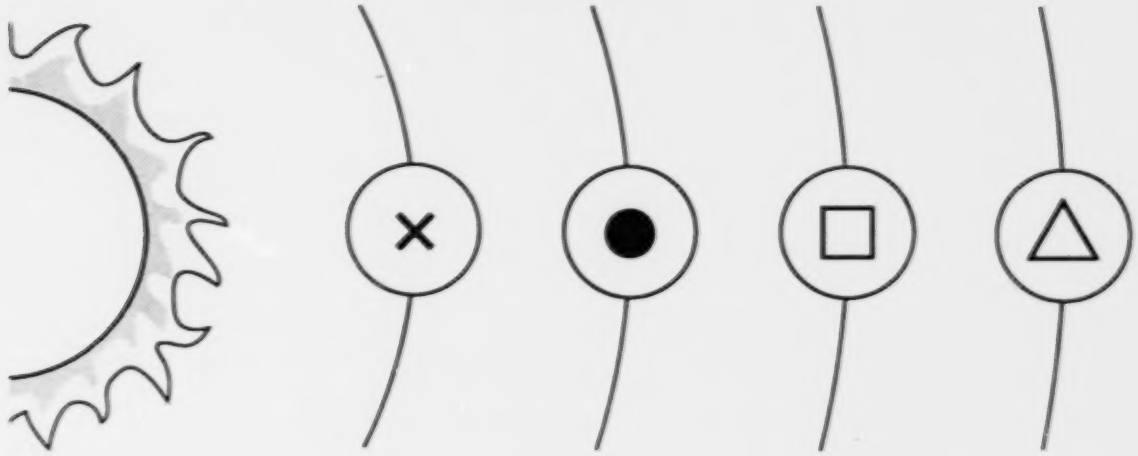
- There are four planets revolving around a central star.
- For easy reference, the planets have been assigned symbols instead of names (△, ✕, ●, □).
- The planets have nearly circular orbits that do not overlap.

1 The table below and the diagram on page 30 of your Student Response Book show the information we currently have about the new planets in this new solar system. Study the charts to look for patterns in the data and to decide what additional information you would like to have to describe this solar system and its planets as completely as possible.

TABLE I

Name	Surface Temperature	Number of Moons	Tilt of Axis	Composition
△	0°C	4	15°	helium and hydrogen
✕	200°C	9	90°	lead and nickel
●	30°C	0	25°	copper and sodium
□	20°C	6	60°	neon and carbon

ORBIT DIAGRAM



Step A Describe a pattern in this data which is similar to data from our solar system.

Step B On the lines below, write AT LEAST three questions (more if you can) about additional scientific data on the new solar system and its planets that could be gathered with further study.

Step C

Throughout history people have observed, recorded, and predicted what happens in the sky. Ancient people constructed calendars and temples and even had festivals to celebrate the precise clock-like motions of the planets, stars, and comets. Probably the most famous example of a patterned happening was Halley's comet. Edmond Halley observed and recorded the motions of a comet and predicted that it would reappear on Christmas day in 1758. Amazingly, his observations were so precise that the comet did appear on that Christmas day, sixteen years after he died.

On the lines below, describe three additional repeating patterns of astronomical change that occur in the sky above us which you have learned about previously.

Pattern 1:

Pattern 2:

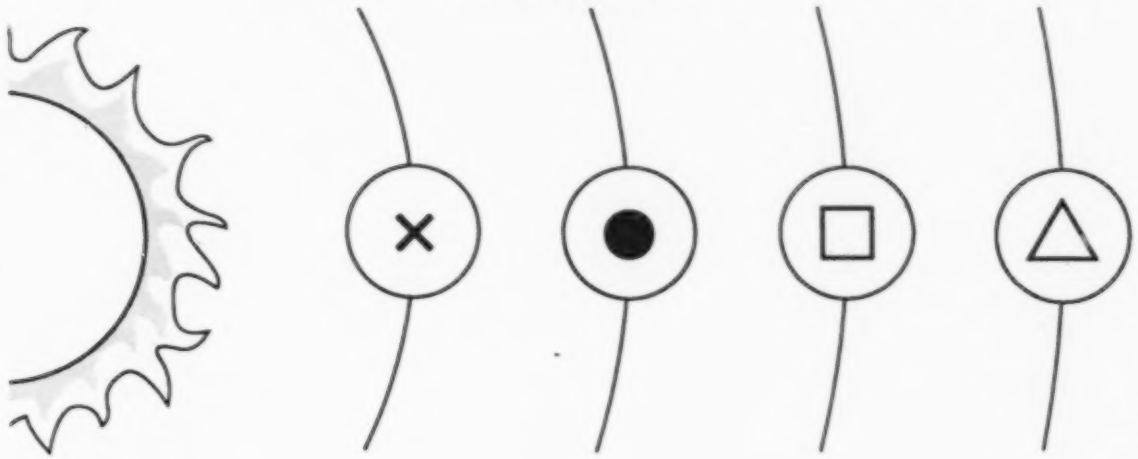
Pattern 3:

2 The table of information below (Table II) shows the positions of the four planets in the new solar system during the four months they have been studied. The "Orbit Diagram" shows the planets ordered by their distance from the sun.

TABLE II
POSITIONS OF THE FOUR PLANETS

PLANET IN:	January	February	March	April
ORBIT 1	A	E	A	E
ORBIT 2	A	D	G	B
ORBIT 3	A	C	E	G
ORBIT 4	A	B	C	D

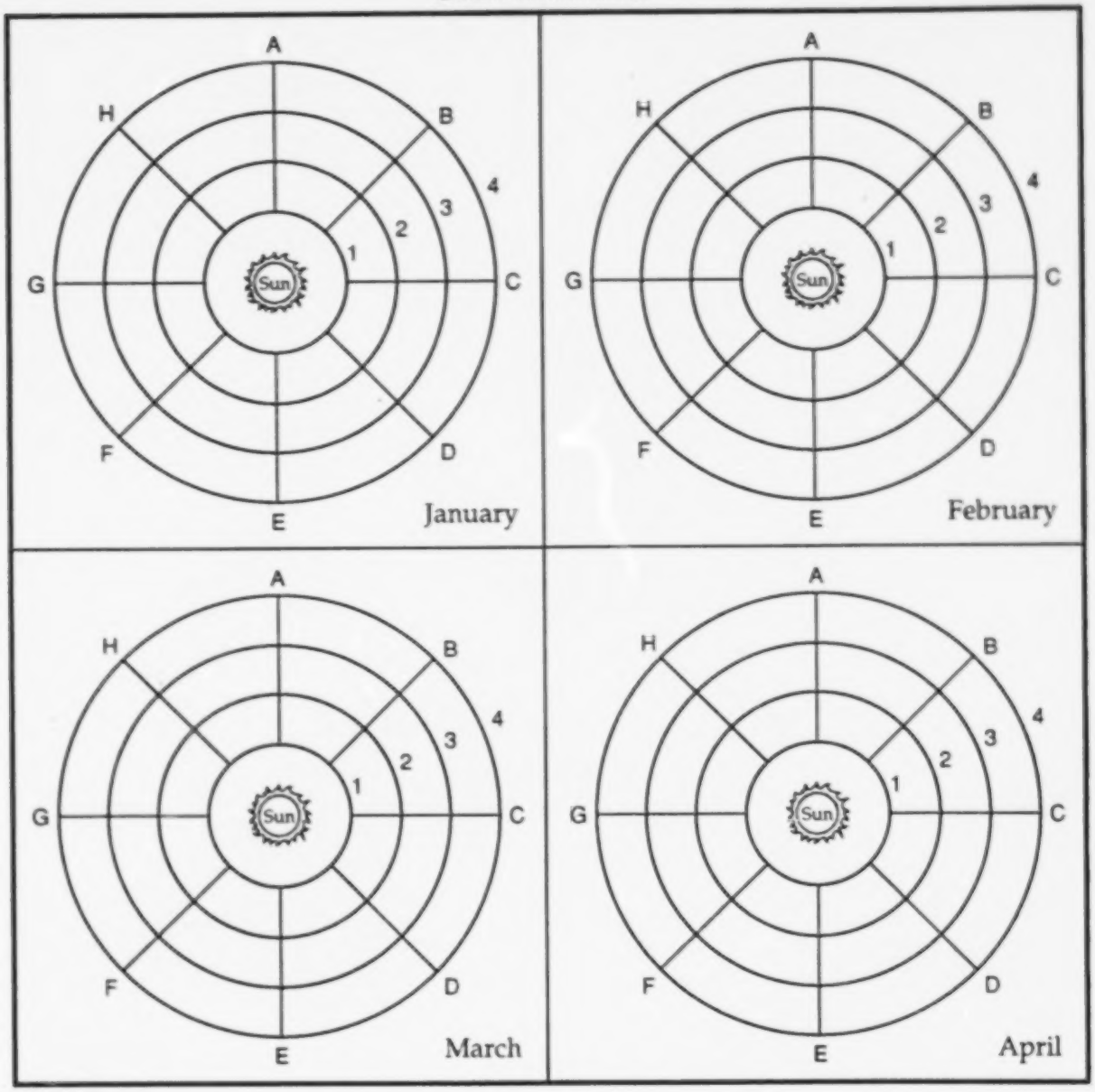
ORBIT DIAGRAM



Working with the members of your group, use the data in Table II and the "Orbit Diagram" to complete the "Orbit Data Logs" on page 33. Draw in the symbols of the planets in their correct positions and order for January, February, March, and April.

You may use the "Orbit Data Logs" worksheet to prepare a first draft of these drawings and to make certain that all members of your group agree on the answer. Then copy your group's answers onto each of your "Orbit Data Logs" on page 33.

ORBIT DATA LOGS

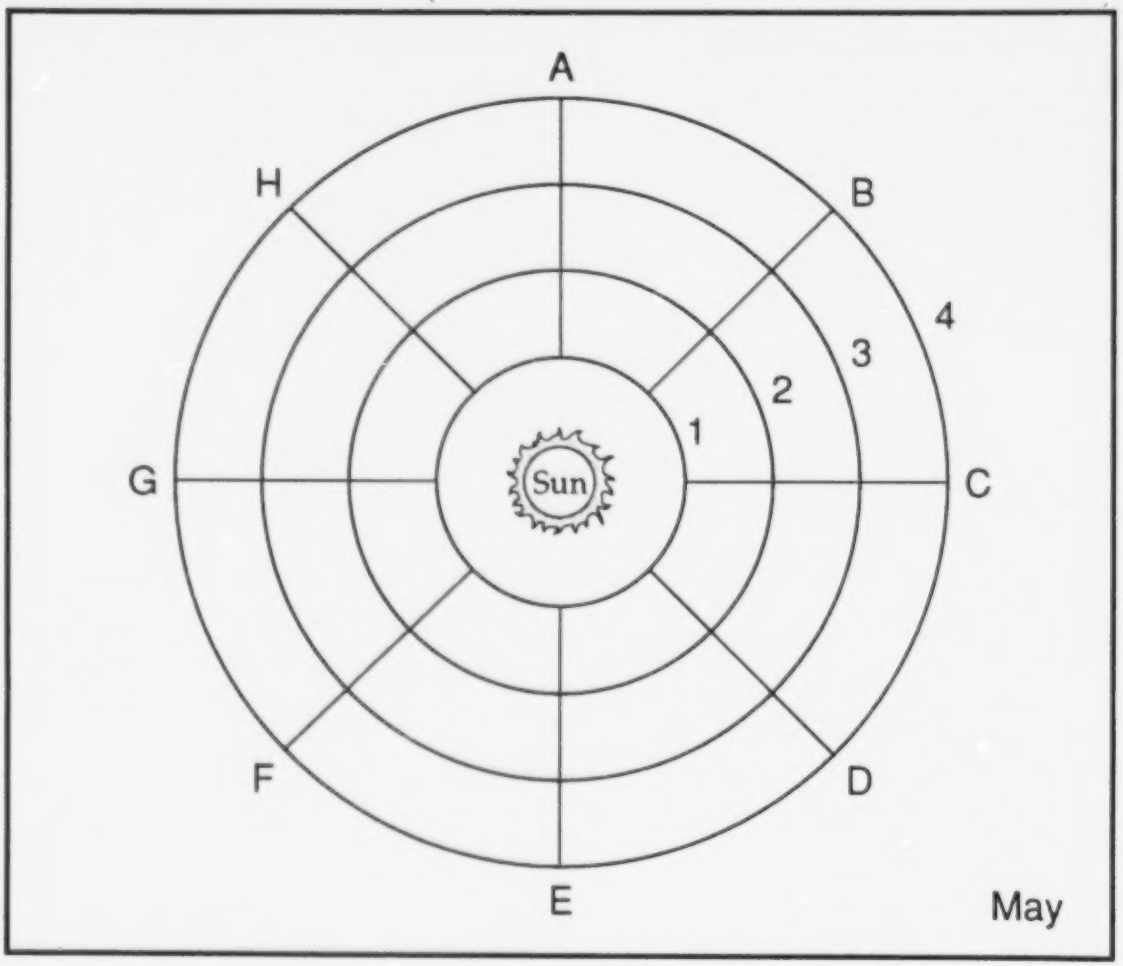


3

Step A

Now, working by yourself, study the positions of the planets from January through April that you drew on the "Orbit Data Logs." Look for patterns. Predict the positions of all four planets during May. Record your predictions on the diagram below.

You may use pennies to represent planets and move them around on the diagram to help you make your predictions.



Step B

Decribe the steps in the thinking that helped you to make your predictions.

4

Step A

Space and Telescope Magazine wants to record the next planetary alignment of this new solar system. This will require reserving time on the cameras aboard our orbiting space telescope.

Predict the month when all the planets will next line up at position A.

Step B

How was the thinking to make this prediction like that you used in Activity 3, Step A? How were the steps here different?

Step C

Write a paragraph for a younger student describing how the model of the solar system using orbit diagrams and/or pennies helped you or did not help you make your predictions.

5 Often, one scientist's ideas may conflict with the ideas of other scientists. In such situations, scientists often modify their theories based on evidence presented by others.

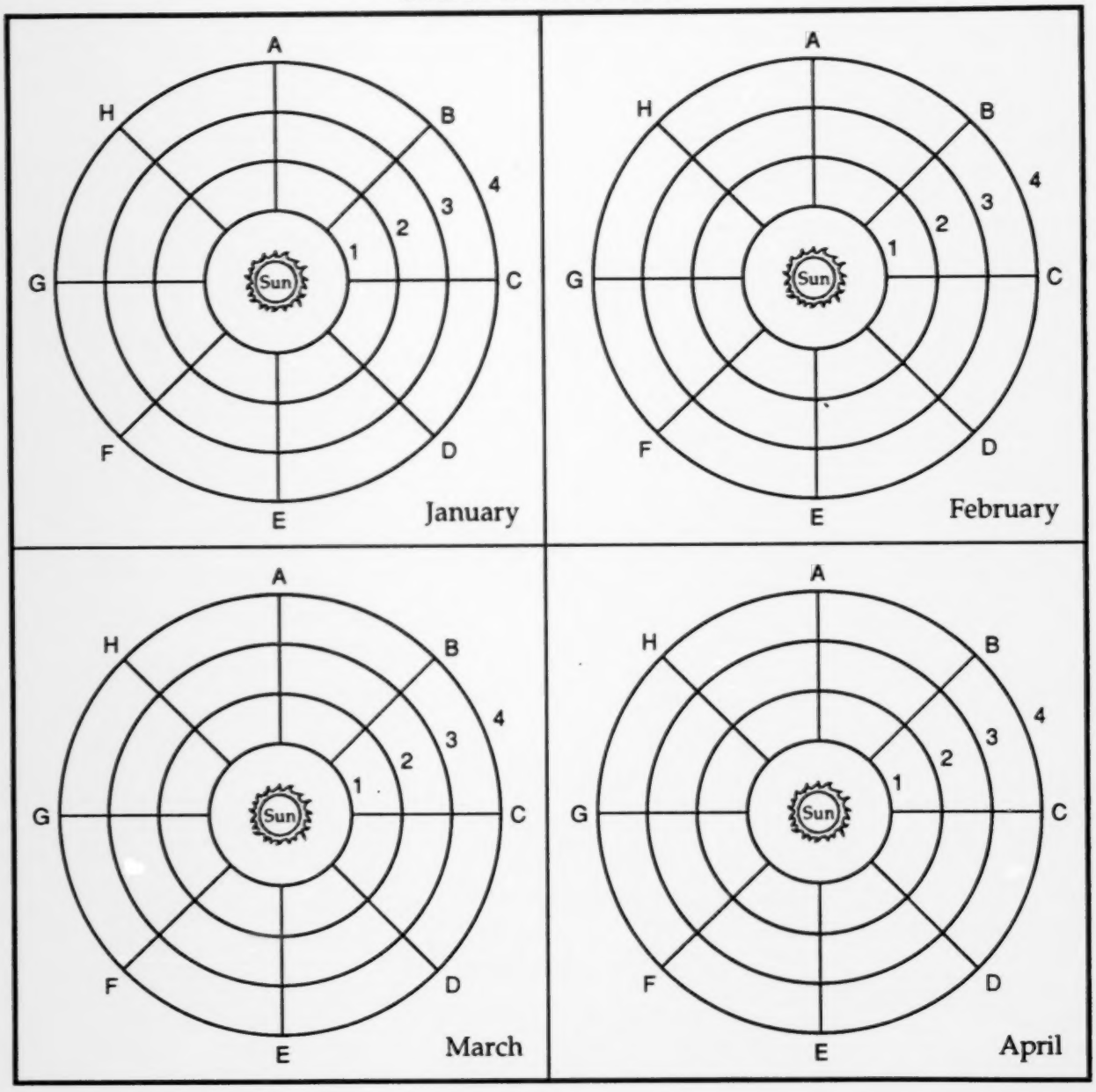
Write a description of how your ideas or the ideas of others were influenced by working in a group.

6 Draw a circle around the number below that shows how easy or how hard it was for you to complete the activities in this task.

1	2	3	4	5
Very easy	Somewhat easy	About average	Somewhat hard	Very hard

MANIPULATIVE

ORBIT DATA LOGS



EXAMINER'S MANUAL

Wednesday

Secure information pertaining to other tasks

has been removed from this area.

Task 2 Title: Planetary Patterns

Total testing time for this task, beginning with oral directions, is **40 minutes.**

Preparation

The activities in this task give students the opportunity to make predictions based on patterns in the motions of planets in an imaginary solar system. Students will also think and write about some aspects of the nature of scientific investigations.

Copy the following task summary table on the chalkboard.

ACTIVITY	HOW STUDENTS WORK	SUGGESTED TIME (MINUTES)
1	Individual	10
2	Group	10
3	Individual	9
4	Individual	5
5	Individual	5
6	Individual	1

Before you begin the administration of this task, consider a room arrangement which will facilitate students working individually and in groups of four. Develop a plan for:

- randomly assigning students to groups of four when they enter the room
- organizing and distributing the materials

Materials/Equipment needed:

For Activity 2, each group of four students should receive:

- 16 pennies, poker chips, or colored-paper circles, 4 for each student
- 4 copies of the "Orbit Data Logs" worksheet, 1 for each student

SAY **Today you will be scientists working together in teams. Some of your investigations may go smoothly for you, others may not. That's the way it is in science.**

The title of this task is "Planetary Patterns." It is an earth science task with six activities. After completing Activity 1 on your own, you will work with members of your group to make some predictions in Activity 2. Then you will work on your own to complete the remaining activities. There is a chart on the chalkboard that gives you suggested times for each activity.

Point to the chart.

SAY **Try to pace yourself so that you are sure to complete the task.**

Now open your Student Response Book to page 29 and follow along as I read aloud.

Allow students time to locate the correct page.

SAY **During this task, you will be required to respond to activities by writing. Whenever you see this picture, it is important to check to make sure that what you have written is clear and complete and that you have used correct spelling, grammar, punctuation, and capitalization.**

Read the introduction to the task and then complete Activity 1 by yourself. When you finish Activity 1, STOP and wait for more directions. You may begin.

Move among the students, encouraging them to pay attention to the suggested time for Activity 1. When time for Activity 1 is up, distribute the materials to the students.

SAY **Now you will read the introduction to Activity 2 on page 32 and begin working with your group. You will make some predictions and develop a model of how the newly discovered planets move in their orbits. When your group completes Activity 2, wait for more directions.**

Move among the students, encouraging them to pay attention to the suggested time for Activity 2. When time for Activity 2 is up,

SAY **Now you will have a chance to work individually to complete the remaining activities in your Student Response Book. From time to time I will write on the chalkboard the number of minutes that you have left to work on these activities. Try to finish all the activities in your Student Response Book, or as many as you can. You may now begin to read Activity 3 on page 34 of your Student Response Book. Continue working until I say STOP.**

Move among the students, monitoring their progress and encouraging them to pay attention to the suggested times. Write the remaining testing time on the chalkboard at appropriate intervals. When time for completing the task is up, move to Task 3.

Secure information pertaining to other tasks

has been removed from this area.